

From these experiments uncorrected for ellipse, we have,—

Exp. 6. 8. On N.E. and S.W. line $\frac{14+12}{2}=13^{\circ}.0$ in one hour.

7. 9. On N.W. and S.E. line $\frac{10.66+11.10}{2}=10^{\circ}.88$.

I have since made a great variety of experiments with this apparatus, which, notwithstanding the theoretical and practical disadvantage of working with so short a pendulum, I hope to render accurately effective, so that the angular deviation of the pendulum-plane may become an ordinary and easy experiment. It should, however, be tried in a glass case, and probably *in vacuo*.

4. "Note on instantaneous Photographic Images." By H. F. Talbot, Esq., F.R.S. &c.

"Having recently met with a photographic process of great sensibility, I was desirous of trying whether it were possible to obtain a truly instantaneous representation of an object in motion. The experiment was conducted in the following manner. A printed paper was fixed upon a circular disc, which was then made to revolve on its axis as rapidly as possible. When it had attained its greatest velocity, an electric battery, kindly placed at my disposal by Mr. Faraday, was discharged in front of the disc, lighting it up with a momentary flash. A camera containing a very sensitive plate of glass had been placed in a suitable position, and on opening this after the discharge, an image was found of a portion of the words printed on the paper. They were perfectly well-defined and wholly unaffected by the motion of the disc."

"As I am not aware that this experiment has ever succeeded, or indeed been tried, previously, I have thought it incumbent on me to lay an early account of it before the Royal Society."

5. "On the Impregnation of the Ovum, in the Amphibia (Second Series), and on the Nature of the Impregnating Influence." By George Newport, Esq., F.R.S., F.L.S. &c. Received June 19, 1851.

The author commences his paper by stating that, having given direct proof, in his former paper, that the spermatozoon is the impregnating agent, and also that the *liquor seminis* does not effect impregnation, he now proposes to detail some new experiments which bear on the views he then advanced; and especially with respect to the nature of the impregnating influence.

He first details some additional experiments with *solution of carmine*, with the object to show, that the result of one experiment mentioned in his former paper, in which he detected a small granule of carmine within the vitellary membrane, was attributable to the cause he then assigned—accidental injury to the egg; and he states that the results of his present investigations confirm him in the view then held,—that no natural perforation or fissure exists in the envelopes of the egg, either of the Frog or of the Newt, before, or at the

time of impregnation; and that the spermatozoon does not penetrate into, but only lies in contact with the envelopes.

He next gives the results of some experiments with solution of potass, in confirmation of his former observations; and further shows, the effect produced on the egg by immersion in solutions of potass and soda, with different proportions of the salts; and afterwards details the results of other experiments made to test some of the more remarkable ones by Spallanzani with regard to the effect of very minute quantities of the impregnating fluid. In these trials the author has proceeded by the mode of direct application of the fluid, and not by immersion of the eggs in large quantities of water, with small proportions of seminal fluid, the mode followed by Spallanzani. The result of the direct application through contact, *once only* with each egg, with the point of a pin wetted with the fluid, was, that this was sometimes sufficient to effect the commencement of segmentation, and consequent *partial impregnation*; while, if the fluid was allowed to drain off the pin, by continuing the contact for a few seconds, then complete segmentation, and full impregnation followed, and, other circumstances being favourable, an embryo was produced; and when the head of a pin was employed to apply the fluid, then the usual result was full impregnation; so that these results confirm those by Spallanzani. The author further states that it appeared to be of no consequence as to which surface of the egg was touched, the dark surface, light surface, or the side,—the result was the same.

He next proceeds to show, that when the egg is immersed in *pure* seminal fluid a *directly opposite result ensues*. Segmentation then seldom occurs, and the embryo is but rarely produced; and further, that the effect then produced on the egg is very similar in appearance to that of the *chemical action* of solution of caustic potass; the yolk becomes shrivelled and decays. These results he thinks are not explained by the views at present entertained respecting the nature of impregnation. The author then refers to the observations made by himself, and also by M. Quatrefages, which tend to show that no impregnation is effected, even by the contact of the spermatozoon with the egg, when all motion in the spermatozoon has entirely ceased; and he conceives that this fact, when considered with the results now obtained, leads to a new view of the subject.

Reference is then made to the views of Faraday, Mr. Grove, Matteucci, and others, respecting the correlations of the physical forces; and the author mentions that the relations of the vital to the physical forces were referred to by himself in 1845, and also in the same year by M. Mayer, and that his object now is to apply these views to the investigation of the function of impregnation. He thinks that impregnation is commenced, if not entirely completed, by what may possibly prove to be a new condition of force, *in*, and *peculiar to*, the impregnating agent, the spermatozoon, which he designates *sperm-force*, and distinguishes from the force of growth and development in cells, through which the spermatozoon is produced. He further distinguishes it from the force of *muscular contractility*, and

from that of the *nervous system*, and states that he regards the whole only as modifications of one common force, and as having correlations with the physical forces. In support of this view the author enters into details, and refers to some late analyses by Dr. Frerichs, to show that the spermatozoa, like muscle and nerve, not only have a definite structure, but also a definite chemical composition, and that this composition appears to be the same in different classes of animals. He thinks that the spermatozoa may thence be regarded as organs of a special modification of force, and that motion is the visible exponent of this form of force, since the spermatozoa are quite inefficient to impregnate when their motion has entirely ceased. The author further thinks that it is only by the adoption of views of this kind that the apparently contradictory results obtained are likely to be explained.

In the course of his observations the author states a remarkable fact, which he has repeatedly verified, and which he thinks is of importance, namely, that the *first cleavage or division of the yelk, in the egg of the Frog and Toad, corresponds in its line of direction to the longitudinal axis of the body of the embryo* of those animals; and this he proposes to show more particularly hereafter.

6. "The Human Iris; its Structure and Physiology." By Bernard E. Brodhurst, M.R.C.S. Communicated by Thomas Bell, Esq., Sec.R.S. &c. Received May 22, 1851.

The author commences by stating that the iris is an active fibro-cellular tissue, or that it may be considered to be a transition tissue from the ordinary fibro-cellular to the organic muscular: that it is a tissue differing from every other in the body; being possessed of a motor power exceeding that of any other tissue, yet differing in construction and appearance of fibre from those other tissues, the types of motion.

He remarks that the microscope shows that the fibres of the iris differ essentially from muscular fibre, whether striped, or of organic life: they are pale, easily separable and readily torn; but they resemble in no essential particular muscular fibre; indeed, the effect of galvanism on the iris is totally opposed to that produced on muscular fibre.

He observes that the nerves that pass to the iris are derived from both motor, sensitive and vegetative nerves; but voluntary motion is not supplied, neither sensation. The motions of the iris are wholly independent of the powers usually deemed motor; they are influenced primarily by the sympathetic system of nerves, through which motion is accorded without sensation, motion without design.

In death, the author observes, the iris assumes a median state, the pupil being neither dilated nor contracted. In health, it is contracted. During sleep it is contracted. During the presence of disease, the pupil is dilated, and so much dilated beyond its usual state, as the tonicity of the vegetative system is removed, as the presence of disease operates on the nutritive system to diminish not only the power of nutrition, but, in a like degree, tension of the visceral system; nutrition and tension